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University of Gondar and Addis Continental Institute of Public Health

Pediatric HIV treatment, care and support services at health center levels in Ethiopia

By Solomie Jebessa, MD,

Advisor: Dr.Nigussie Deyessa

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List of Abbreviations:

ACIPH: Addis Continental Institute of Public Health

AIDS: Acquired Immune Deficiency Syndrome

ANECCA: African Net work for Care of Children Affected by HIV /AIDS

ART: Anti -retro Viral Therapy

CTX: Cotrimoxazole,

DBS: Dried Blood Spot

EGPAF Elizabeth Glaser Pediatric AIDS Foundation

EPI: Extended Program of Immunization

FHAPCO: Federal HIV AIDS Prevention and Control Office

FMOH: Federal Ministry of Health

HAART: Highly Active Anti-Retro viral Therapy

HC: Health Center

HCSP: HIV/AIDS Care and Support program

HEI: HIV Exposed Infant

HIV: Human Immunodeficiency Virus

ICAP: International Center for AIDS care and Treatment Programs

IMNCI Integrated Management of Neonatal and child hood illness,

INH: Isoniazied (anti- TB drug)

JHPIEGO Johns Hopkins Program for International Education in Gynecology and Obstetrics

KHB: Kehua Bio-engineering Co.Ltd-HIV 1&2 Antibody (colloidal Gold) Rapid test kit.

LTFU Lost- to- follow -up

MDT: Multidisciplinary team

MNCH: Maternal, Neonatal and Child Health

MoH: Ministry of Health

MSH: Management Sciences for Health

OVC: Orphans and Vulnerable children

PCR: Polymerase Chain Reaction

PHC: Primary Health Care

PITC: Provider initiated HIV Testing and counseling

PLHIV: People Living with HIV

PMTCT: Prevention of Mother to Child Transmission of HIV

PN: Pediatric Nurse

PTWG: Pediatric Technical Working Group

RR: Relative Risk

SNNPR: Southern Nations and Nationalities and People's Region

TA: Technical Assistance

TAT: Turnaround time

TB: Tuberculosis

WHO: World Health Organization

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Abstract

Back ground: In Ethiopia there is low enrolment rate among HIV patients in general and pediatric HIV cases in particular. There are interventions done to improve pediatric HIV care at primary health care level, but so far there have never been any assessments done.

Objectives: is to compare the skills of health care providers on pediatric HIV care & treatment and compares the enrollment of pediatric patients for HIV care and follow up at the supported and non-supported health centers.

Methods: Analytic – retrospective cohort study was conducted on 79 supported and 39 non supported health centers in Oromia, Tigrai, Amhara and SNNPR. The supported health centers were provided with training and regular mentorship on Pediatric HIV care, support and treatment for two years. Data on Skills of health care providers was measured with standardized tool that was pre-tested in Addis Ababa health centers. Data on enrollment of HIV infected and exposed children were collected. Data was entered into Epi-Info and analyzed using SPSS for windows.

Results: Skills on clinical examination and diagnosis (RR = 1.72; 95%CI; 1.23, 2.41), skill in clinical laboratory (RR=1.48 95% CI; 1.08, 2.03), were found to be Good ≥70% in the supported health centers compared with the non-supported. Similarly, Cotrimoxazole dosing skills (RR = 1.34; 95% CI; 1.11, 1.62), skill on follow up of ART Patients (RR= 3.02 95% CI; 1.6, 5.7), skill on HIV Exposed infant follow up and management (RR= 4.57; 95% CI; 1.66, 12.6) and keeping proper medical records (RR=3.1; 95% CI; 1.83, 5.2) were again better in the supported health centers. A paired sample T- test showed statistically significant result (P-value =0.001) with mean increment of 20.61 in the number of pediatrics patients on HIV care and mean increment of 13.93 in patients on ART in the supported health centers in the two years period (Dec 2008-2010) .

Conclusions: this study showed that most health workers in the supported health centers had good skill in managing pediatrics HIV patients and the rate of pediatrics HIV patients' enrollment rate was found to be significantly increased in the supported health centers, hence more health centers should be supported technically via training and mentorship to scale down the pediatrics HIV care services to Primary health care level to scale up the program.

1. Introduction

The number of people living with HIV/AIDS (PLHIV) at the end of 2009 were 33.3 million [31.4–35.3 million] and the number of people newly infected with HIV in 2009 were 2.6 million [2.3–2.8 million] and the AIDS deaths in 2009 were 1.8 million [1.6–2.0 million]. The estimated number of children living with HIV increased to 2.5 million [1.7 million -3.4 million] in 2009. In sub Saharan Africa the estimated number of PLHIV were 22.5 million which is 68% of the global figure. [1]

In 2009 an estimated 370000 children [220,000- 520,000] contracted HIV during the prenatal and breast feeding period .[1]

In 2009 alone, 1.2 million HIV infected people received antiretroviral therapy for the first time – an increasing in the number of people receiving treatment of 30% in a single year .Overall the number of people receiving therapy has grown 13 fold, more than five million people in low and middle income countries since 2004. Expanding access to treatment has contributed to a 19% decline in death among people living with HIV between 2004 and 2009 .this is just the beginning : 10 million people living with HIV who are eligible for treatment under the new WHO guide lines are still in need .[1]

The 2009 progress report made by countries in scaling up ART for children: in 2008 over 275000 children received ART up from 127000 in 2006, and this is 38% of those in need using the previous 2006 recommendations for ART initiation in children and now when the 2010 guide line is to be implemented the number of children will be increased tremendously. [2]

HIV infected infants frequently present with clinical symptoms in the first year of life, without effective treatment an estimated one third of them will die by one year of age and about half will die by two years of age hence greater efforts are needed to save the lives of these children through effective interventions to scale up services for care and treatment in accessible way to the patients .[2]

Ethiopia is one of the countries hit hardest by the HIV epidemic in Africa, according to Federal HIV/AIDS Prevention and Control Office (FHAPCO), the single point prevalence estimate for Ethiopia in 2009 was at 2.2% and like in many countries, this is mainly an urban epidemic with urban HIV prevalence at 7.7% in contrast to the rural prevalence of 0.9%. The number of people living with HIV were estimated to be 980 000 [880 000 - 1 100 000]. The number of adults aged 15 years and above living with HIV were estimated to be 890 000 [800 000 - 970 000] and the number of deaths in the same year were estimated to be 67 000 [57 000 - 77 000] and 650 000 [540 000 - 780 000] children were estimated to be orphaned due to AIDS.[3]

In Ethiopia In 2010 February, the numbers of children enrolled in to care were 29,546 and the cumulative numbers of children ever started on ARV therapy were 13650 while the forecasted estimates for the same year were 72,945 to be on care and 26,347 to be on ART respectively.[4] Of the 13650 children enrolled 7800 were currently on ART and of these 7716 were on 1 st line and 84 children were on 2nd line treatment regimen.

The above statistics shows that children (0-14 years) made only 5.6 percent (7800/139,494) of the patients on ART. The situation was even worse for USAID-Ethiopia's HIV/AIDS Care and Support Program (HCSP) supported sites that had only 2.0 percent (950/46,562) of clients on

ART being children at the end of June 2009. This was far below the WHO recommended expected performance of 10-15%.[4]

The Pediatric HIV treatment, care and support has been given at Hospital level at first which created high work load at the hospitals and the adult HIV care was decentralized a way before the pediatric HIV care, hence most children were neglected to be kept at home without getting any care and treatment due to poor access to the hospitals .

Decentralization of the pediatric HIV care to the health centers was officially launched since Sept, 2008 by the Federal Ministry of Health (FMOH) and Partner organizations have been supporting health centers by providing Technical Assistance (TA). After the start of the TA Program, the pediatric patient rollout has not shown marked improvement as was expected for several months because of : Lack of mentorship activities following trainings because of shortage of staff mentors, Parents were not given due time and proper health education about the importance of testing of their children for HIV, DNA PCR test kit was not available at health centers in Oromia, Amahara, Tigrai and SNNPR until a year back, lack of Organized DBS testing centers /machines at the regional Laboratories, Poor linkages between across the spectrum of Maternal Neonatal and child Health (MNCH) and PMTCT and other facility based curative services as well as community based services, including OVC (Orphan and Vulnerable children) programs.

The USAID HCSP (HIV care and support program) has been implemented by MSH Ethiopia (Management Science for Health) as a prime partner since July 2007 and ANECCA Ethiopia (African Net work care of Children affected by HIV/AIDS) since February 2009, as a sub partner in 350 health centers from the five big regions: Oromia, Amhara, Addis Ababa, Tigrai and

SNNPR. These Health centers were labeled as ‘ART health’ centers and were supported by the program by giving comprehensive HIV training, specialized pediatrics HIV trainings, mentorship to the health care providers and by provision of different job aids on HIV care treatment, care and support.

This study described the over all activities of the health centers pertaining to specifically to pediatrics HIV care and support and assessed also over all the impact of the pediatrics part of the HCSP program by comparing the supported and non supported health centers and this will enable identification of areas of weakness as well areas of strengths to further scale up the Pediatric HIV care programs at PHC level all over Ethiopia.

2. Literature Review

When the pediatric HIV care, support and treatment program has been thought of at Primary health care level there have been several requirements to be fulfilled in order to be able to treat pediatrics patients by lower level health workers.

In a collaborative PMTCT and Pediatric HIV strategic planning Work shop held in Nigeria in April 2008 by ICAP on the title "Increasing pediatric care and treatment uptake at ICAP supported sites scaling down pediatric HIV to scale up the care, the components of care those were suggested should be at PHC level are : counseling and testing using rapid antibody tests, genealogy form, DBS for PCR, disease staging clinical and Cd4, CTX prophylaxis, growth monitoring, Immunization, nutrition and infant feeding support, developmental assessment, TB Screening and INH prophylaxis, Adherence counseling and psychosocial support, provision of ART, follow up and patient tracking and referral linkages and the consensus was that children seen in PHC setting should be provided with basic minimum package of services and regardless of where the child received care and treatment quality should not be compromised to achieve this there was a need to address human man power, commitment and resources to the PHC and task shifting for this to be successful. [5]

Further assessment of pilot programs were also necessary to see the effectiveness of the scaling down of the pediatric HIV care and treatment programs and according to a study done in South Africa on a title of "increasing access to ARV: implementing a system of down referral of ART stable patients to PHCs in Ekurhuleni districts, Gauteng province" they found that down referral patients to PHCs usually on ART increased by 55% in one quarter of 2009 compared to the same Quarter in 2008 prior to implementation of Down referral. The down referral also increased

patient access to life saving medication due to proximity; reduced loss to follow up, from above 10% to 5% in 2009; all trained nurses gained competence in managing ART, improved quality of care and from five initiation sites to twenty PHC sites. [6]

In another study done in Mozambique on integration of HIV /AIDs services into African PHC, they found that decentralization and integration of HIV care services in to the existing PHC system in Mozambique has improved: the access to care through expansion of sites and services, service quality through reduced LTUF and improved patient flow and system efficiency by linking services and improving referral rate while accelerating the pace at which services can be expanded. [7]

On XVII international AIDs conference done in Mexico, on Aug 3rd, 2008, on the title: 'getting more children into care in south Africa'; the Elisabez Glaser Pediatrics AIDs Foundation (EGPAF) supported 28 ART initiation sites with 75 Primary Health clinics; in these sites there were 79,804 adults and 7991(10%) of children under 15 years of age enrolled in to care and the number of people initiated on ART were 48,417 adults and 5401 (11%) children. Prior to their interventions they found that there were a number of problems to be tackled which contributed for the poor identification and rollout of pediatric HIV patients; and these barriers were : Suboptimal provider initiated testing and counseling (PITC) and clinical staging at various entry points, PCR testing limitations, especially at PHC level such as long TAT - 3 weeks (plasma) to 3 months (DBS), Skills limitations – PCR testing technique/methods, no results available because of loss of specimens, poor data capturing, etc. and Ineffective referral of HIV infected infants and children to care and treatment with the referral outcome often unknown. The other problems they identified were HIV positive mothers not bringing their infants and children for

treatment services due to: Stigma and discrimination, denial, guilt, fear, cost, trans-border migration, Non-disclosure of HIV status to partners, family, and children, Cultural beliefs (e.g. use of traditional medicines, ARVs do not work/kill), Poor integration of pediatric HIV services at various service points: at IMCI, EPI, TB – vertical HIV programs, children assumed to be TB contacts were not offered HIV test, Poor attitudes, ignorance and lack of ownership – some health care workers at other service points have the "HIV is not our problem" mindset, Lack of knowledge which results in a lack of confidence in managing pediatric HIV and AIDS, HIV testing policies and patients rights have been also other barriers : parents can refuse testing on behalf of the child, Constitutional right to confidentiality (non-disclosure), Child Health Act - confusion around HIV-testing consent; Child-headed households, Orphans and Vulnerable Children (OVC).[8]

The program tried to overcome these problems by strengthening PITC in pediatric wards, Pediatric nurse (PN) and counselors ward rounds, Elisa+, awaiting CD4 count & viral load results, Post-test counseling, treatment literacy on HAART especially on adherence counseling. They also initiated HARRT in the ward, and strengthened in the follow-up clinic visits, Growth monitoring, adherence counseling, increased PCR testing /day to 40 infants tested per day, Pediatric nurse, counselor and parents' responsibilities made clear and Community engagement in awareness-raising efforts around pediatric care and treatment and Support groups for moms and children, as well as support groups for caregivers. [8]

Hence as we have seen in the above literatures, decentralizing the HIV care and treatment program to the Primary Health Care(PHC) level is the best way to enroll more children in to care and to save those who are being neglected and dying at home. Especially critical shortage

of doctors has lead many hospitals and health settings vacant of highly trained experts so this situation has lead WHO to recommend ‘’task shifting’’ i.e the task of prescribing ART should be shifted from doctors to nurses so that more patients can be treated. And even though that task shifting to nurses and health officers was feared at first, it has been shown that this task shifting has been very effective and safe with respect to the hospital based services.

In a pilot task shifting program done in Rwanda trained nurses were able to prescribe ART safely and effectively in rural and Sub Saharan setting given sufficient training, mentoring and support and nurse lead Prescribing of ART could mean that timely, appropriative treatment reaches many more HIV patients.[9]

Even though the task shifting has been the major way to decentralize patients to more accessible care, there have been a lot of challenge associated with it and one of the of challenge is attrition of trained health workers from their original area of work place where they have been trained and supposed to work on their field of expertise .

In Ethiopia, on a study done on the tracing of HIV trained Health workers, data was collected on 1744 health care providers in 53 hospitals and 45 health centers in 10 regional and administrative states; it was found out that 32.6 % of the providers were no longer at the sites where they have been supposed to work so because of this high attrition rate, so there is a continuous need to train health workers so that the service will not be compromised and a need to devices mechanism to retain those who have been trained .[10]

In Ethiopian even though decentralizing the pediatric HIV care started two years back there have never been any study done on the assessment on the effectiveness and quality of the program so

this study helps to thoroughly assess this program, to identify the gaps, to see the weakness and strengths so that it will be an eye opener to further scale down the pediatric HIV care to scale up the services at PHC level where the patients have better access.

3. Objectives

3.1 General objective:

The objectives of this study was to assess and compare Pediatric HIV care, support and treatment programs between health centers that received and not received technical assistance on management of pediatric HIV and follow up mentorship supports.

3.2 Specific objectives:

1- To compare skill of health care providers on pediatric HIV care and treatment between supported and non-supported health centers

2- To compare enrollment of pediatric patients for HIV care and follow up at the supported and non-supported health centers

4. Methodology:

4.1 Study Area: The study was undertaken in health centers found in Oromia, Tigrai, Amhara, and SNNPR.

4.2 Study Design: The design was analytic –retrospective cohort – study design.

4.3 Source Population: All ART health centers found in the four regions: Oromia, Amhara, Tigray and SNNPR.

4.4 Study populations: were the health centers which were provided and not provided with the technical assistance of the HCSP program; the supported health centers comprise 37 from Oromia, 21 from Amhara, 17 from Tigrai, and 12 were from SNNPR and the non supported health centers also include 39 from Oromia, 1 from Amhara, 6 from Tigrai and 29 from SNNPR.

4.5 Sample size Determination: The sample size determination was done using the formula for population with two proportions and was computed using Epi info version 3.5.1 statistical software.

$$n_1 = \frac{\left[Z_{\frac{\alpha}{2}} \sqrt{\left(1+\frac{1}{r}\right)P(1-P)} + Z_{\beta} \sqrt{P_1(1-P_1) + \frac{P_2(1-P_2)}{r}} \right]^2}{(P_1 - P_2)^2}$$

Where: r = is the location of ratio of group 2 to 1,

P_1= Proportion in group 1

P_2= Proportion in group 2 =37.5% (baseline finding)

$Z_{\alpha/2}$= is the quintile of the standard normal distribution for type I error

Z_{β}= the quintile of the standard normal distribution for type II error/ power

n_1= sample size for group 1

n_2= sample size for group 2

So, using the above formula –on Epi- Stat calc: with 95% CI, power of 80%, and the Unexposed to exposed ratio of 1:2 and RR of 1.75; with the estimated level of skill among non exposed of 37.5 %, the sample sizes n_1 (supported health centers)= 82, and n_2 (Non–supported health centers)= 41.

4.6 Sampling Procedure:

The numbers of health centers were calculated proportionally from each region: Oromia, Tigrai, SNNPR and Amhara as shown in table 1. Hence, the supported health centers selected were: 33 from Oromia, 20 from Amhara, 16 from Tigrai and 13 from SNNPR. The non supported health centers were 21 from Oromia, 1 from Amhara, 3 from Tigrai and 16 from SNNPR. All were selected using random sampling techniques from the list of the source population indicated on table 1; and in each health center respective health professional working at the ART clinics were selected for skill assessments.

Table 1. Sampling procedure: Proportions of health centers in the HCSP supported and Non – Supported

Regions	Intervened H.Cs	Proportions (%)	Calculated intervened	Non intervened	Proportions (%)	Calculated non intervened
Oromia	37	43	33	39	50	21
Amhara	21	24	20	1	.013	1
Tigrai	17	20	16	6	10	3
SNNPR	12	14	13	29	40	16
Total	87	100	82	75	100	41

4.7 Data Collection Procedures:

Data was collected using structured data collecting tool which was pre-tested at Addis Ababa health centers. The health care providers' skills were assessed on different aspects of HIV care using three approaches: while they were managing pediatric patients, by analyzing details of pediatric patient charts and asking detailed technical questions with requests to demonstrate their clinical skills. All the data collectors were pediatricians and a pediatric nurse. The cut of point to grade them was 70%: those who scored ≥ 70% of the items were graded as Good and those who scored < 70% were scored as having limited skill.

The adult, pediatrics HIV infected and exposed patients' enrollment into HIV care and treatment were collected using the data collection tool in Annex –III-part-2 for the three consecutive years; December 2008, December 2009 December 2010.

Five Physicians and one nurses participated in the data collection. The principal investigator supervised the overall data collection process.

4.8 Measurement of Variables:

4.8.1- Outcome variables:

1- Health care providers' skill on Pediatrics HIV care and treatment disaggregated to:

   a. Skill on clinical assessment, diagnosis, and staging, follow up schedule
   b. Skill on clinician laboratory test ordering, interpreting results and performance of PITC.
   c. Skill on CTX dosing and prescription
   d. Skill on ART care: schedule, drug dosing, assessment of ARV toxicity and Treatment failure
   e. Skill on HEI follow-up: diagnosis by DNA PCR test, care, treatment of infants

f. Skill on keeping medical records relevant to pediatric HIV Management

g. The presence of MDT meeting

2- The trend on receiving Pediatric HIV and HIV exposed Infant care

a. The number of HIV positive children receiving chronic HIV care

b. The number of HIV positive children receiving ART

c. The numbers of HIV Exposed Infants (HEIs) receiving HEI -follow up and care

d. The number of HEIs who had DBS test done

e. The number of HEIs who had DBS test positive

f. The number of HEIs who had DBS positive result and started on ART

4.8.2-Exposure Variables*:* support status of the health centers, distance from the zonal city, health care provider's age, sex, marital status and educational status: Diploma nurse, BSC Nurse, or Health officer were the exposure variables.

***4.9 Data Quality control*:** Quality was assured by training of data collectors, by use of standard and pre-tested data collection tool and use of professionals' pediatrician HIV specialists.

4.10 Data Management:

Data validation: The pediatric patients enrollment count data captured for Dec2008, 2009, 2010 were validated with the data from MSH central monitoring and evaluation office.

Data Entry and Analysis: Data was entered using EPI-info version 3.5.1 statistical soft ware by the principal investigator, after cleaning it was exported into SPSS version 15-data software for analysis. Descriptive and Bi-variate analysis to observe relationship between the independent and the dependent variables has been done. Sample paired T-test was done to see the significance of the increment in pediatric patient roll out was done. Finally results were interpreted, discussed in line with the available literatures and the study objectives; conclusions and recommendations were also made based on the study findings.

5. Operational Definitions:

Technical Assistance (TA): Giving Training and mentoring support to health care providers.

WHO recommended pediatric Rollout: Out of the total number of PLHIV receiving ART the number of pediatric HIV patients receiving ART should be 10-15 %, according to WHO recommendation. [2]

Nationally recommended pediatric Rollout: In Ethiopia, according to the decision by the national pediatric Technical working group (PTWG); the pediatric patients HIV rollout(those who are on ART was estimated to be at least 9% of the total number of PLHIV taking ART, considering the single point estimate for 2009. [11]

Attrition Rate of HIV -trained Health workers: means wearing away or leaving of health care providers who have been trained on HIV care from their place of work where they have been supposed to provide the care.[10]

Knowledge and skill of Health care providers:

By definition: Knowledge: is the information stored up in ones head

Skill: is the ability to use knowledge to accomplish something

Healthcare provider's Knowledge and skills are assessed using the following grading below: [12]

Good= HW can demonstrates some ability/skills in the area at least 70% and above

Limited= HW has limited (<70%) skill despite the availability of the care.

X/NA= Not applicable –if the HW cannot practice due to absence of the care/pediatric patient is receiving the chronic care or HEI care

Level of Patient care: Health facility Pediatric HIV care performance

Good: ≥9% of HIV patients enrolled at the HC are children< 14 years of age.

Moderate: 5-9% of patients enrolled are children < 14 years of age,

Poor: passive approach to recruitment of infants and children into care

≤5% of patients enrolled are children < 14 years of age

Multi-disciplinary team: A group of health care and social care professionals who provide different services for patients in a coordinated way. [13]

6. Ethical consideration

Ethical clearance and Permission*:* The ethical board of ACIPH gave the ethical clearance for this study, and based on the ethical clearance, permission to undertake this study was obtained from the regional health beauros and also collaboration letter was written by Management science for Health (MSH) to the health centers.

Consents and confidentiality*:* Health care providers were asked for their verbal consent to participate in the study those who consented participated in the study; the health care providers who participated in this study were not identified by names and the data collected was coded,

7. Results

7.1 Socio-Demography

A total of 123 health centers and their health care providers have been sampled to be involved in this study, 117 have been assessed making a response rate of 95%. One health center could not be assessed because of safety problems to go there, two were closed on the date of data collection, and three could not be assessed for logistic reason. Among the HCSP supported health centers, a total of seventy nine were included in this study out of which 31 were from Oromia, 20 were from Amhara, 16 were from Tigrai and 12 were from SNNPR. Similarly, in non-HCSP supported Health centers; A total of 38 health centers were included in this study 20 were from Oromia, 3 from Tigrai and 15 from SNNPR as shown in, (Table 2).

A total of 117 health care providers were assessed in this study, and of these 50.4% were females, the mean age of the health workers was 30.32 (±6.24) and it ranges between 22 and 50 years. About sixty two (62.4%) were married and 36.8% were never married. Regarding educational level, 68.4% were diploma nurses, 23.9% were health officers and the rest 7.7% were BSC Nurses. Most (76.1%) the health centers were within 200 km from Zone cities; the maximum distance being 624 kms away from the zonal city.

Similarly, the study subjects in the HCSP-Supported and non-HCSP-Supported were assessed for their difference in socioeconomic status, and the two groups have difference by age, region, sex, marital status, distance from zone city, however, there was not difference in educational level of health providers (table 2).

Table 2. Socio-demographic characteristics of health care providers participated in the study, May, 2011 (n=117)

Variables	**Health center support status**		**X^2 (df)**	**P-Value**
	HCSP-Supported N (%)	NON-HCSP-Supported N (%)		
Region				
Oromia	31 (39.2)	20 (52.6)	19.646 (3)	0.0001
Amhara	20 (25.3)	0 (0)		
Tigrai	16 (20.3)	3 (7.9)		
SNNPR	12 (15.2)	15 (39.5)		
Age of Health workers				
21-30	46 (58.2)	31 (81.6)	6.434 (2)	0.04
31-40	25 (31.6)	6 (15.8)		
41-50	8 (10.1)	1 (2.6)		
Mean (±SD)= 30.32 (±6.24)]				
Gender				
Female	52 (65.8)	7 (18.4)	21.205 (1)	0.0001
Male	27 (34.2)	31 (81.6)		
Marital status				
single	20 (25.3)	23 (60.5)	13.964 (2)	0.001
Married	58 (73.4)	15 (39.5)		
Widowed	1 (1.3)	0		
Educational status				
Diploma nurse	57 (72.2)	23 (60.5)	3.424 (2)	0.181
BSC-Nurse	7 (8.9)	2 (5.3)		
Health officer	15 (19)	13 (34.2)		
Distance from Zone city				
0-50Km	25 (31.6)	17 (44.7)	13.733 (5)	0.017
51-100Km	18 (22.8)	5 (13.2)		
101-200Km	16 (20.3%)	8 (21.1)		
201-300Km	10 (12.7)	0		
301-400Km	6 (7.6)	2 (5.3)		
>501Km	4 (5.1)	6 (15.8)		

Table 3. Different Skills and knowledge of HWs in HCSP- supported and Non- supported HCs, May 2011,

Different Skills and knowledge of HWs	**Good (≥70%) N (%)**	**Limited (<70%) N (%)**	**RR (95% CI)**
Clinical Exam/diagnosis skill(n=115)			
HCSP-Supported	68 (86.1)	11 (13.9)	1.72 (1.23, 2.41)
NON-HCSP-Supported	18 (50.0)	18 (50.0)	1.00
Clinical Lab skills(n=110)			
HCSP-Supported	63 (82.9%)	13 (17.1%)	1.48 (1.08, 2.03)
NON-HCSP-Supported	19 (55.9%)	15 (44.1%)	1.00
CTX prescription, dosing Knowledge, skill (n=117)			
HCSP-Supported	78 (98.7)	1 (1.3)	1.34 (1.11, 1.62)
NON-HCSP-Supported	28 (73.7)	10 (26.3)	1.00
Skills on-On ART Follow up(n= 103)			
HCSP-Supported	66 (84.6)	12 (15.4)	3.02 (1.6, 5.7)
NON-HCSP-Supported	7 (28.0)	18 (72.0)	1.00
Skills on HEI-Follow-up(n=85)			
HCSP-Supported	64 (91.4)	6 (8.6)	4.57 (1.66, 12.6)
NON-HCSP-Supported	3 (20.0)	12 (80.0)	1.00
Skill on comm./Adherence(n=114)			
HCSP-Supported	73 (92.4)	6 (7.6)	1.04 (0.9, 1.2)
NON-HCSP-Supported	31 (88.6)	4 (11.4)	1.00
Skill of keeping proper medical records (n=113)			
HCSP-Supported	72 (91.1)	7 (8.9)	3.1 (1.83, 5.2)
NON-HCSP-Supported	10 (29.4)	24 (70.6)	1.00
Multidisciplinary team (MDT) (n=117)	Presence	Absence	
HCSP-Supported	74 (93)	5 (7)	1.48 (1.2, 1.9)
NON-HCSP-Supported	24 (63)	14 (37)	1.00

7.2 - Assessment of different types skills of health care providers

7.2.1 -Assessment of health care providers' skills on clinical examination and diagnosis

As shown in table 3; 86.1% of the health workers scored 'good' on Clinical examination and diagnosis skills from the supported sites while 50.0% scored good from non-supported health centers. The reason for limited skill to reach relevant diagnosis was lack of frequent mentorship/ supervision in 82% of the HCSP supported HC health workers and was lack of training in 50% of the HWs in unsupported HCs, this difference was statistically significant, (RR= 1.72; 95% CI;1.23, 2.41). Lack of supervision and absence of proper pediatric formats and lack of experience were the other reasons described by 17% and 11% of health workers in the non HCSP HCs respectively, (Fig 1).

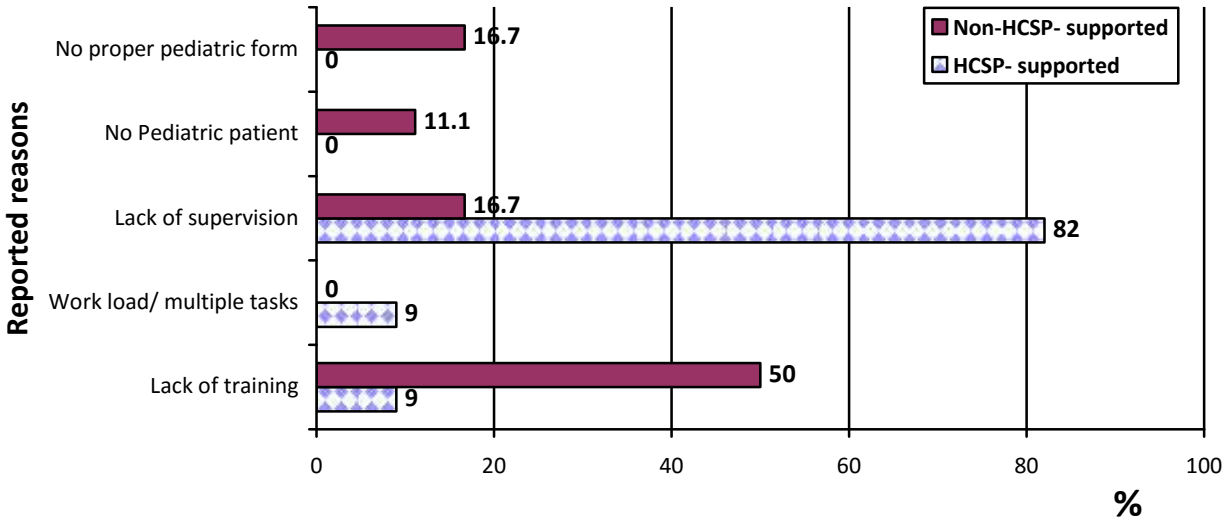

Fig 1. Reported reasons why health workers had limited skills in reaching to clinical diagnosis at supported and non supported health centers, May, 2011(HCSP n=11;Non-HCSP n=17)

7.2.2 Assessment of health care providers' skill on Clinical laboratory: ordering tests, interpretation of results and performance of Provider Initiated HIV Testing and Counseling (PITC)

About 110 of the 117 Health care providers who were found to be practicing laboratory tests ordering, interpretation of results and performance of PITC (HIV test). On this evaluation 82.9% of the HWs in the HCSP supported health centers were found to have good skills, but only 55.9% from the non HCSP supported health centers had good skills in this respect, this difference was statistically significant, (RR = 1.48; 95% CI; 1.08, 2.03) (Table 3).

Low PITC performance in the ART clinics

Thirty four health centers from the Non-HCSP supported and 17 health centers from the supported HWs were not giving PITC services at their ART clinics which they were supposed to do it. Comparable percentage of HWs from the HCSP (64.7%) and from Non- HCSP (64.7%) gave the main reason for failure to comply on this was that they did not consider it to be a task to be done at the ART clinics (Fig 2).

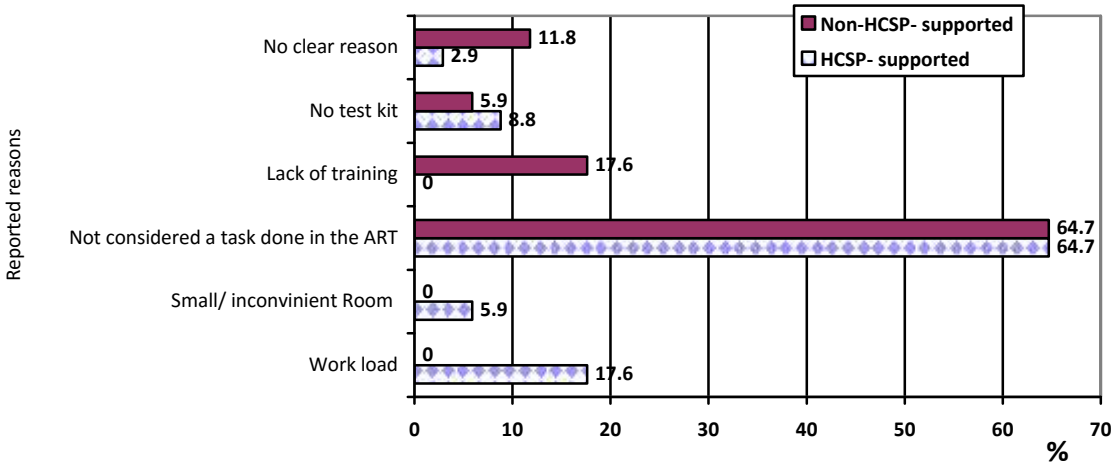

Fig 2. Reported reasons why health care providers were not providing PITC service at the ART clinic in the supported and non supported health centers, May 2011, (HCSP n=17; Non-HCSP n=34)

7.2.3 -Assessment of health care providers' skill on cotri-moxazole (CTX) dosing and prescription

Almost all the 117 health centers' providers were found to prescribe cotri-moxazole and overall 90.6% have good skill. When we look at the two groups; 98.7% of the supported health centers' providers scored good when compared with 73.7% of the unsupported, this difference was statistically significant, RR= 1.34; 95% CI; 1.11, 1.62), (Table 3).

7.2.4- Assessment of health care providers' skills on follow up of patients On ARV therapy

Assessment of knowledge and skills of health workers on the ART follow up schedules, on proper ARV drugs dosing, on the assessment of ARV drugs toxicity and failure. One hundred and three of the total 117 health centers were found to have Pediatrics HIV patients on ART drugs and hence have been found to have some experience on this respect. Nearly Eighty five percent (84.6 %) of the supported health centers had good skills, while only 28 % of the non-supported, had good skills, this difference was statistically significant, RR= 3.02; 95% CI, 1.6, 5.7), (Table-3). When looking at the reason the health care providers were not practicing proper ART dosing for pediatric patients it was found out to be lack of mentorship in 4 HCSP supported HCs and absence of pediatrics patients and deficiency of training were the two main reasons in 23% and 52 % of the non HCSP sites, (Fig 3.).

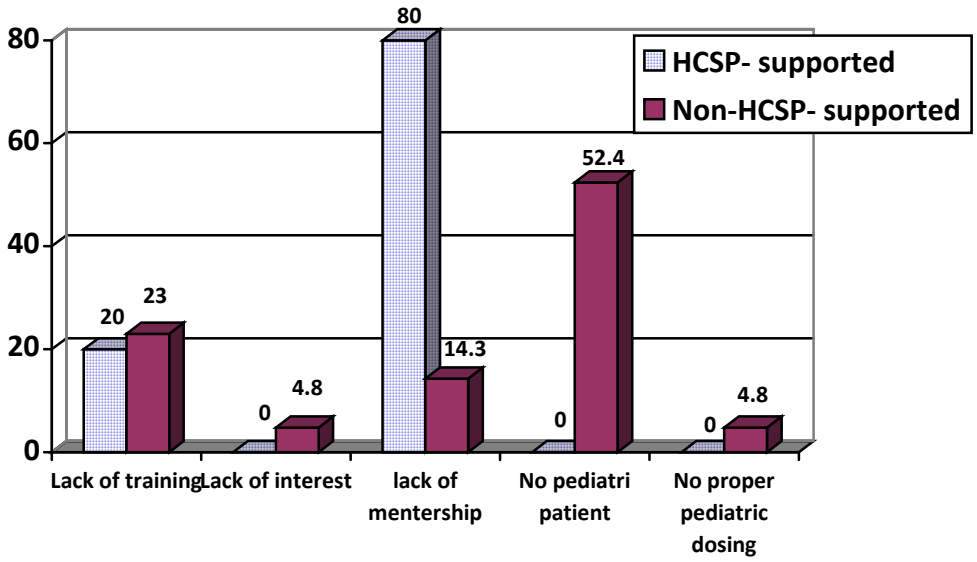

Fig 3. Reason why Proper Pediatric ART drugs prescription was not practiced in the supported and non supported HCs, May 2011, (HCSP n=17; Non-HCSP n=34)

7.2.5. Assessment of Health care providers' skill on HIV Exposed Infant (HEI) Follow up

Out of the 117 health centers assessed eighty five health centers: 70 HCSP and 15 Non HCSP supported heath centers were found to have at least one HIV exposed infant. Ninety one percent (91%) of the supported health centers HWs were assessed to have good skill on HEI follow up and management, but only 20 % of the non HCSP sites were found to have good skill on this respect, this difference was statistically significant, RR = 4.57; (95% CI; 1.66, 12.6), (Table-3).

Why DBS is not done by clinicians in the ART clinics

Seventeen (17) health workers in the HCSP and 27 in the non HCSP health centers were not performing DBS test by themselves and the reasons that they gave were : Most (82.3%)of the health workers in the HCSP supported health centers said that they have not been doing it

because the test have been done by laboratory technicians at the HC , while most (48.1%) of the HWs in the Non HCSP supported sites said that they were not doing it for lack of test kit and 25.9% said that they were not trained how to do DBS and 22.2 % said both (Table 4).

Table 4. Reason of Health care providers of not doing DBS test for HEI s in the ART clinics of supported and non-supported health centers

Reason Why DBS is not done by clinicians	HCSP-Supported N (%)	NON-HCSP-Supported N (%)
No kit	0	13 (48.1)
Incomplete kit	1 (5.8)	0
Done in Laboratory	14 (82.3)	1 (3.7)
Lack of training	1 (5.8)	7 (25.9)
No Kit & Trained personnel	0	6 (22.2)
Long turn around time	1 (5.8)	0
Total	17	27

7.2.6. Assessment of health care providers' skills on Communication and adherence

The assessment of communication and adherence counseling with HIV positive children and their care giver /parents revealed that 92.4% of the health care providers in the supported health centers have good skills and comparable (88.6%) of the HW from the non-supported health centers also demonstrated good ability in this skill, there was no statistical significant difference, (RR=1.04; 95% CI, 0.9, 1.2), (Table-3).

7.2.7. Assessment of Healthcare providers' skills of keeping proper Medical Records

Medical records were checked especially patients charts whether they contained the necessary meaningful data which describes the patient status and were found to be ≥70% complete in 91% of the supported health centers and in only 29.4% of the unsupported health centers, showing a statistically significant difference, (RR= 3.1; 95% CI; 1.83, 5.2), (Table 3).

The reason for not filling pediatric intake forms properly in the HCSP sites were negligence or lack of interest in 35.7% and lack of supervision in 28.6% of Health workers . In the Non – HCSP supported health centers the two main reasons were said to be lack of training in 38.5% and unavailability of pediatric intake forms in 38.5 %. (Fig.4)

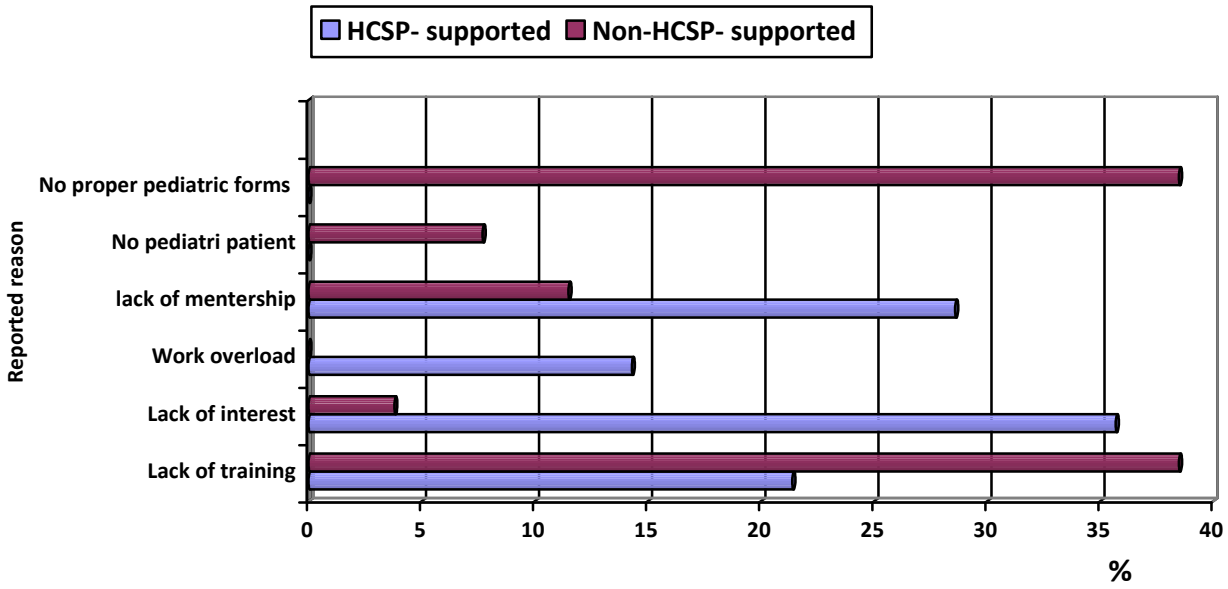

Fig 4. Reason of why Health workers were not filling Pediatric intake forms in the supported and non- supported health centers, May 2011, (HCSP n=14 Non-HCSP n=26)

7.2.8-MDT team meeting

Multi disciplinary team (MDT) –Meeting has been carried out in 93.6% of the HCSP supported and 63% of the non –HCSP supported health centers, in most health centers the meeting has been carried out every month and in some every 2-3 month, and this difference was statistically significant, (RR= 1.48; 95% CI; 1.2, 1.9). (Table -3)

7.3 - HIV patients' enrollment receiving HIV care and treatment from Dec 2008 to Dec 2010:

In this study, as shown in fig 5 and 6 the number of adult and pediatrics number of patients increased markedly from Dec 2008 to 2010. Details of number of patients trend is presented on Annex V:

7.3.1 Enrollment in Adult HIV patients on care and on ART

The number of adult patients on pre ART care increased from 15969 to 34471 in the HCSP supported HCs; and from 90 to 1245 in the non HCSP supported HCs.

The number of adult patients on ART care increased from 11355 to 29801 in the HCSP supported HCs; and from 16 to 1022 in the non HCSP supported HCs.(Fig 5)

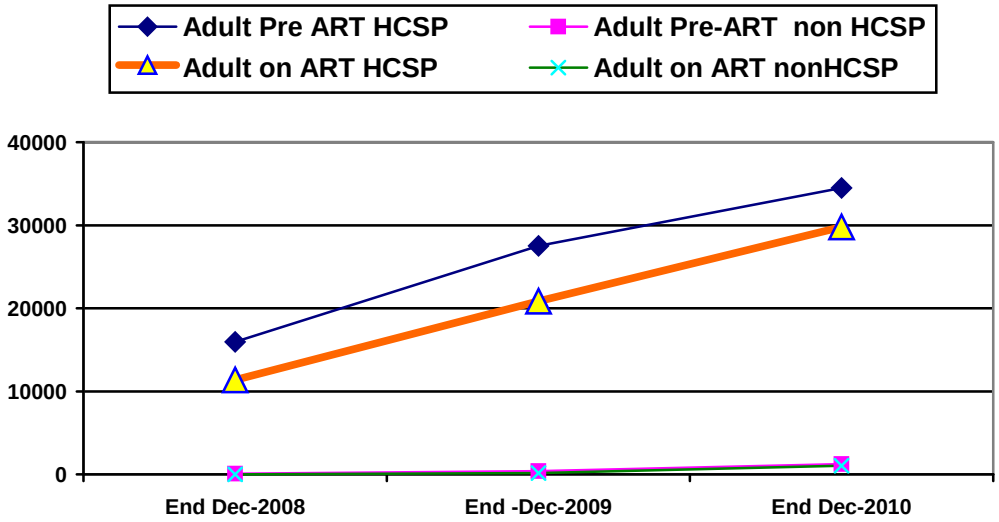

Fig 5- The adult HIV care enrollment from Dec-2008- 2010 in the supported and unsupported Health centers.

7.3.2 Enrollment of in pediatrics patients on care and on ART

The number of pediatrics patients on pre ART care increased from 672 to 2280 in the HCSP supported Health Centers; and from 2 to 104 non HCSP HCs and the number of pediatrics patients on ART in creased from 67 to 1143 in the supported HCs and from 0 to 62 in un supported HCs from Dec 2008 to Dec 2010. (Fig 6)

A paired sample T- test showed statistically significant result (P-value =0.0001) with mean increment of 20.61 in pediatrics patients on HIV care and mean increment of 13.93 in pediatrics patients on ARV treatment in the supported health centers between the two years period (Dec 2008-2010) .

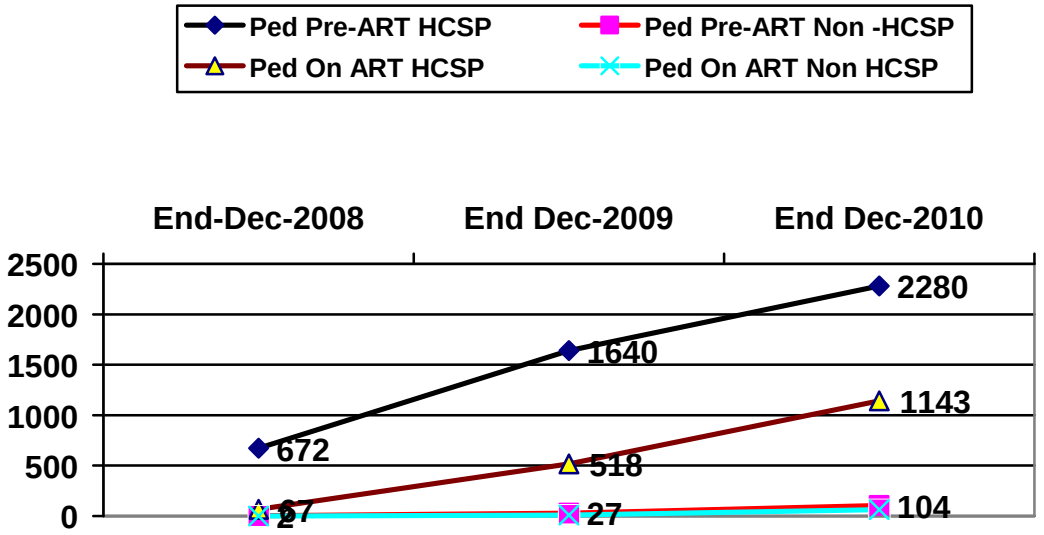

Fig 6- The Pediatric HIV care enrollment from Dec-2008- 2010 in the supported and non-supported HCs

Table 5- A paired sample T- test for pediatrics patients on HIV care and on ART in Dec2008 and Dec2010 in the supported HCs (n=75)

Paired samples	Mean	Std. Deviation	Std Error Mean	95% CI of the difference		T	Df	Sig (2 tailed
Dec 08-Ped Pre ART Dec 10- Ped Pre ART	-20.61	17.02	1.1.966	24.53	16.697	-10.486	74	.0001
Dec 08- Ped On ART Dec 10-Ped On ART	-13.93	10.81	1.248	-16.42	-11.45	-11.163	74	.0001

7.3.3. Enrollment of HIV Exposed infants (HEIs) on Follow up, diagnosis and care

The number of HIV Exposed infants' data was lacking for most Non –HCSP HCs in Dec 2008.

The HEI care started at least by enrollment in the HCSP HCs in 2008 by 75 to be increased to 1390 in 2009 and to 3623 in Dec 2010; the DBS test became available at the HCSP supported health centers in August 2009 and 639 infants were tested, and the number of infants tested tripled by Dec 2010, with 2215 infants tested. (Table 6 and Figure 7)

Table 6- HIV Exposed infant's enrollment test and care in Dec 2009 and 2010

	HCSP Supported HCs		Non HCSP HCs	
	Dec2009	Dec-2010	Dec 2009	Dec -2010
Total HEI	1390	3623	5	110
DBS tested	639	2215	1	36
DBS Neg	562	1932	1	20
DBS Pos	74	222	0	1
DBS Pos On ART	56	121	0	1
HIV Neg confirmed	254	788	0	1

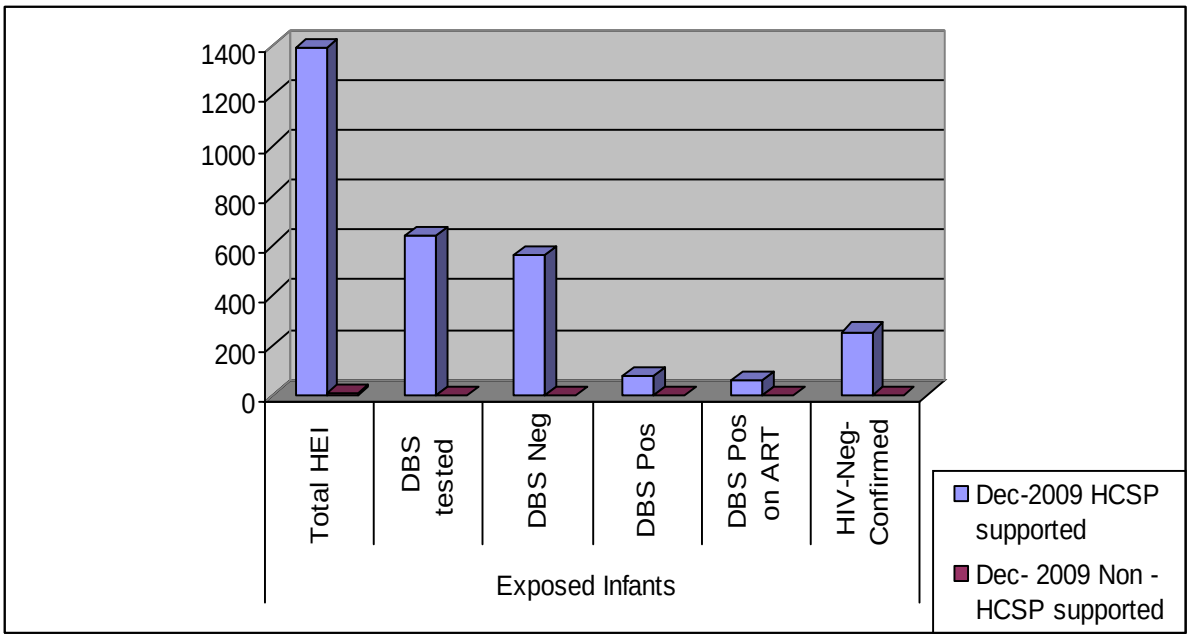

Fig 7- HIV Exposed infant's enrollment test and care in Dec 2009 in Supported and non supported health centers.

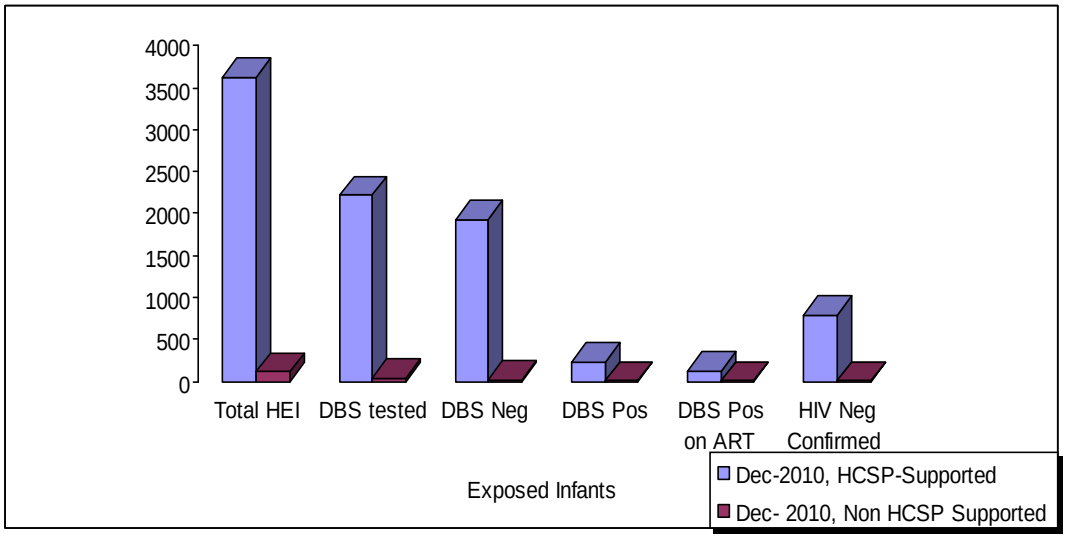

Fig 8- HIV Exposed infant's enrollment test and care in Dec 2010 in Supported and non supported health centers.

8. Discussion:

In this study, the HCSP supported ART Health centers 86% of the health care providers were having competent skills in making the correct clinical assessment, this is believed to be one of the most important criteria to scale down the pediatric ART service at the PHC level as was suggested in a collaborative PMTCT and Pediatric HIV strategic planning work shop held in Nigeria in April 2008 by ICAP. [5]

In this study one of the contributing factor for low laboratory skill assessment for 17.1% in the HCSP and 44.1% in the non HCSP HCs' health care providers was the fact that PITC services was not done by the clinician at the ART clinic, which was also observed in primary health clinics in the South African study supported by EGPAF .[8]

In this study there was marked difference between the supported and unsupported health centers with regard to the HEI follow up skill ; 91.4% of HWs scored ≥ 70% (Good) in the HCSP sites compared to only 20 % of HWs from the non –HCSP sites. This limitation was due to the poor DBS testing because of lack of test kit and lack of trained personnel and this was again observed to be prominent gap in the pre-intervention assessment done in the primary health care settings in South Africa supported by EGPAF.[8]

It was also found out that the main reason for limited ordering of basic laboratory tests (WBC count, CD4 and blood chemistry) was the fact that CD4 count was not done timely because of lack of budget for blood sample transportation from the health centers to the hospitals. And the main reason for not to be able to interpreter results was failure to apply the knowledge gained through training in the HCSP sites but lack of training in the non HCSP sites.

For most of those health centers that don't have MDT team, there was no clear reason, but some said that there was lack of organization between the team, deficiency of good team spirit and failure of the previous team to solve problems hence failed to organize another one.

When looking at the enrollment of pediatrics patients receiving chronic HIV care and treatment, it was found out that the number of pediatric patients on pre-ART and ART care has been going from 672 and 67 to 2280 and 1143 respectively in the supported health centers from Dec 2008 through Dec 2010, while when we look at the enrollment in the non supported health centers the number of patients on Pre ART care increased from 2 to 104 and those who should be on ART increased from 0 to 62.

Further analysis of the enrollment in the supported health centers using Paired sample T-test showed significant difference in the increment of pediatrics patients receiving care and treatment with in the two years period in the supported health centers. The big number of patients enrolled in the supported H.C in Dec 2010 in reference to the starting period Dec 2008 was as a result of the technical support given to the HCSP supported health centers and was also because the fact that the health centers selected to be supported were also those with high case load , this was consistent with the finding seen in the pilot program in the PHCs in Ekurhuleni districts, Gauteng province in South Africa which increased patient enrollment in to ART service rate by 55% after the start of technical support program . [6]

As it was seen in the result of this study, the number of HEI care started at least by enrollment in the HCSP HCs in 2008 by 75 to be increased to 1390 in 2009 and to 3623 in Dec 2010; the DBS test became available at the HCSP supported health centers since August 2009 and 639 infants were tested in the same year , and the number of infants tested tripled by Dec 2010 (2215); and

this is the main component of the pediatrics HIV care services in the supported health centers as was suggested to be a strategy to scale up pediatrics HIV care and treatment programs by the ICAP report . [5]

9. Strength and limitation of the study

Strengths

1- This is the only study done to asses health care providers' skills in different aspects of pediatrics HIV care , support and treatment programs so the result can be used as a back ground for the national pediatrics HIV scaling up program at the primary health care settings as well for the partner organizations supporting the program in the future .

2- The study contains details of skill assessments and as well enrollment rate of the pediatrics patients in to chronic HIV care and support services at health center levels

3- This study has identified prominent gaps and strengths in the area of pediatrics HIV care, support and treatment which will give guide to the ministry of health in further strategic planning.

4- The skill and knowledge and assessment of the health care providers was done by professional pediatrician who can look through the details of pediatrics patients so can be taken as most relevant data with correct assessment .

5- The study was done in the four big regions so can represent well the ART health centers in Ethiopia.

Limitations

1- The HCSP health centers selected for the support were said to be high case load/prevalent ones this might affect the trend analysis in the comparison of the supported and unsupported health centers

2- There was no specific study done in this topic to be reviewed and even related studies were very few.

10. Conclusion

1- Most of the health care providers ‘in the HCSP supported HCs were found to have good skill with respect to pediatrics history taking, physical examinations and reaching to the relevant diagnosis and WHO HIV clinical staging when compared with nearly half of the health care providers ‘ from the non-supported HCs .

2- One of the major laboratory skill assessments, the PITC service has been neglected by comparable number of health workers from both supported and unsupported Health centers.

3- Almost all health care providers from the supported and three fourth from the non supported have good skill in prescribing Cotrimoxazole prophylaxis for Pediatrics HIV patients and exposed infants.

4- Most of the health care providers from the supported health centers have good skills regarding pediatrics HIV patients on ART care but only one fourth of the HWs from the non supported sites have good skill on this respect.

5- Most of the health care providers from the supported health centers have good skill regarding HIV Exposed Infants follow up and care compared to only one fourth of those from the non supported sites .

6- The health care providers’ skill on communication and adherence counseling for parents and care givers of pediatrics HIV patients in both the supported and non supported health centers have comparable results.

7- Most of the health care providers from the supported health centers have good skill in keeping proper pediatrics medical records compared to one third of those from the non supported sites

8- Three fourth of the supported health centers have functional MDT teams compared to quarter of the unsupported health centers

9- The pediatrics patients roll out has been markedly raised in the supported health centers

11. Recommendation

1-Even though the health workers have good skills in most of the supported health centers the fact that PITC services are not practiced at the ART clinics will affect further finding of pediatrics HIV patients so this should be given emphasis by the health centers to identify those in need .

2- The PITC service has been neglected by comparable number of health workers from both supported and unsupported Health centers and this should be considered as a big gap in the identification of HIV positive children

3- Not all health centers with HIV care had HEI follow up and care services with lack of the DBS test and not all the HIV exposed infants have been tested even in those with the available care and services so this should be given strong emphasis

4-Even though the enrollment in the pediatrics patients in to care and treatment shows some improvement(Mean 4.1%) we are still far behind than the nationally recommended figure of 9 % which shows that we need to further scale up the program by making it more accessible to the community .

5-More studies should be encouraged to be conducted on this subject.

Annex:

Annex I: Collaboration letter

Date ……

To ----------Health center

…….Region

This is to request the collaboration of your health center in the study under the title "Assessment of Pediatric HIV treatment, care and support services at health center levels in Ethiopia" by Dr.Solomie Jebessa, a pediatric HIV consultant.

The study will try to compare the knowledge and skill of Health care providers on pediatric HIV care and treatment and also will compare rate of enrollment of pediatric patients for HIV care and follow up at the intervention and non-intervention Health centers.

The investigators will try to fill two data collection tools in your Health center which needs good collaboration from your respective staffs, so would you please introduce the investigator with your staffs and request them to give their time to be interviewed and to be assessed by the investigator

HCSP / MSH

Addis Ababa/ Regional Head Office

Address:…….

Date: ……...

Annex II: Consent form

INTRODUCTION – Greetings, I am a pediatric HIV consultant and second year MPH student. I am interviewing Health care providers in order to assess their knowledge about pediatric HIV care and also I will be observing you while you are treating pediatric HIV patients to assess your skills. There for your genuine participation in this study is highly appreciated.

CONFIDENTIALITY &CONSENT- I am going to ask you theses assessment questions, your name will not be written in this form. And you are not obliged to answer any question that you don't want to answer, however you will be greatly appreciated in responding to these questions for it will help us to assess the effectiveness of the pediatrics HIV care, treatment and support program at health center level.

Would you participate?

If yes proceed

If No, Thank and stop

Date & time of interview should be filled here

____/_____/_____ _____

Annex III: Structured data Collection tools:

1-Data collection tool to capture Knowledge /skill data from the health care providers

Health Center: _____Date: ___/ ____/ ____

Health Care Providers: Age (Yrs)……, Gender…….Marital status ……..

Educational status,_____ i) BSC Nurse, ii) HO, iii) Diploma Nurse

Please assess Health worker (HW) /Clinician skills (those who work at the ART clinic) using the grading below:

Yes – If the health worker can perform the activities mentioned

No – If the Health worker cannot perform (but was expected to do so) state the reason

X/NA – Not Applicable, if the health worker is not entitled to perform the activity

Skills/knowledge- Pre ART follow up (HIV pos, but not started on ART)	**Yes/No/X**	**If No, why not**
I-Clinical assessment of patients		
101-History taking: Can the HW take complete paediatric history (including family, social, and developmental & nutrition)?		
102-Physical examination: Can the HW conduct adequate physical examination (in relation to history)?		
103-Diagnosis: Can the HW does complete and accurate Dx?		
104-Clinical staging: Does the HW perform clinical staging routinely?		
105 -Clinical staging – Does the HW perform clinical staging accurately?		
106 –Follow up plans- Does the HW communicate clear follow up plans for Pre ART patients?		
II- Laboratory tests		
201 Does the HW order lab tests appropriately?		
202 Does the HW review and interpret results appropriately?		
203 Does the HW Perform PITC?		

III- Prescription (CTX): **301-** Does the HW write appropriate and complete prescription of CTX?		

IV- On ART follow up :			
	401-Does the HW have Knowledge on Follow up schedule?		
	402- Does the HW perform proper Pediatric ART Dosing?		
	403- Does the HW perform assessment of ARV Toxicity?		
	404- Does the HW perform assessment of ART Failure?		
V-HEI Follow up			
	501- Does the HW perform **f**ollow up of HEI according to the national HEI follow up Chart		
	502- Does the HW perform DBS test?		
	503-Does the HW enroll DBS Positives in to HIV /ART care?		
VI- Communication with patients :			
	601- Does the HW has good attitude to patients (including listening, Concerns, treating patient with respect, confidentiality)?		
	602-Does the HW discuss clinical assessment results and management plan with patient/caregiver/family?		
VII- Adherence assessment (for CPT and ART) : **701 –** Does the HW perform adherence assessment to CPT and ART?			
VIII –Medical Records			
	801 –Does the HW fill Pediatric intake form properly?		
	802 –Does the HW fill the National Follow-up card (Blue/green card)?		
	803 –Does the HW plot Growth monitoring charts Properly?		

	804 –Does the HW fill HEI follow-up forms properly?		
	805_ Does the HW fill HEI log book/DBS log book? (either of them)		
IX- Team work/MDT team meeting **901 - Able to build and foster team work-MDT team meeting**			

2- Data collection to capture data on the pediatric patients trend receiving HIV care, treatment and follow-up

Region	Health center	Number of Adults enrolled			Pediatric Case Burden			Exposed Infants					
		PRE ART	On ART	Total	Ped Pre ART	Ped On ART	Total Ped	Total no. Exposed	DBS test done	DBS -Neg	DBS Pos	DBS Pos on ART	Rapid test neg 9 mo-18 mo non BF infants
Dec 2008													
Dec 2009													
Dec 2010													

Level of Patient care: Health facility performance

Good: ≥9% of HIV patients enrolled at the health center are children< 14 years of age,

Moderate: 5-9% of patients enrolled are children < 14 years of age,

Poor: passive approach to recruitment of infants and children into care
≤5% of patients enrolled are children < 14 years of age

Annex IV: Lists of HCSP and Non HCSP-supported Health centers:

1- List of HCSP-supported Health centers: Oromia Region

S. No	Region	Zone	Name of H.C	Involved in OPR	Data collected by	Distance from Zone city	Health Care providers interviewed			
							Age	Sex	Marital status	Educational status
1	Oromia	Jimma	Jimma	Yes	Dr.Tadesse	350	39	F	M	DiplomaN
2	Oromia	W.Arsi	Dodola	No						
3	Oromia	Jimma	Agaro	Yes	Dr.Tadesse	390	36	M	M	DiplomaN
4	Oromia	Bale	Robe	Yes	Dr.Alex	445	30	F	M	HO
5	Oromia	Ilubabor	Bedele	Yes	Dr.Tadesse	490	43	M	M	DiplomaN
6	Oromia	N. Shewa	Derra	Yes	Dr.Alex	210	29	M	S	BSC nurse
7	Oromia	W.shoa	Mojo	Yes	Sr.Ekuba	70	28	M	S	DiplomaN
8	Oromia	E.shoa	Zeway	Yes	Dr.Solomie	160	28	F	M	HO
9	Oromia	E.shoa	Adama	Yes	Dr.Solomie	98	38	F	W	DiplomaN
10	Oromia	Shashemene	Shashemene	Yes	Dr.Alex	250	26	F	M	HO
11	Oromia	E.Wolega	Nekemte	Yes	Sr.Ekuba	350	27	F	M	HO
12	Oromia	Guji	Adola	Yes	Sr.Ekuba	400	25	M	S	HO
13	Oromia	E.shoa	Wollenchiti	Yes	Sr.Ekuba	125	27	F	M	HO
14	Oromia	Guji	Shakisso	Yes	Sr.Ekuba	380	28	M	M	BSC Nurse
15	Oromia	Horgudru	Fincha	Yes	Sr.Ekuba	200	26	F	S	BSC Nurse
16	Oromia	Arsi	Dherra	No						
17	Oromia	E.Arsi	Arisinegele	Yes	Dr.Alex	240	27	F	M	BSC Nurse
18	Oromia	Borena	Yabello	No						
19	Oromia	Borena	Moyale	No						
20	Oromia	W.shoa	Holeta	Yes	Sr.Ekuba	38	48	F	M	DiplomaN
21	Oromia	W.shoa	Sebeta	Yes	Dr.Sewagegn	30	29	F	M	DiplomaN
22	Oromia	W.shoa	Woliso	Yes	Dr.Alex	116	35	M	M	HO
23	Oromia	E.shoa	Dukem	Yes	Dr.Solomie	30	26	M	S	BSC Nurse
24	Oromia	N.shoa	Sheno	Yes	Dr.Tadesse	80	25	F	S	DiplomaN
25	Oromia	N.shoa	Sendafa	Yes	Dr.Tadesse	40	27	F	M	DiplomaN
26	Oromia	W.shoa	Ginchi	Yes	Sr.Ekuba	80	26	F	S	DiplomaN
27	Oromia	E.Arsi	Agarfa	No						
28	Oromia	W.Arsi	Adaba	No						
29	Oromia	Wollega	Gimbi	Yes	Sr.Ekuba	430	26	F	M	DiplomaN
30	Oromia	Horgudru	Fincha S.F	Yes	Sr.Ekuba	250	30	F	M	
31	Oromia	Arsi	Arsi Robe	Yes	Dr.Alex	225	32	F	M	DiplomaN
32	Oromia	W.Shoa	Jeldu	Yes	Dr.Alex	165	30	F	M	HO
33	Oromia	W.shoa	Bako	Yes	Sr.Ekuba	250	26	M	M	DiplomaN
34	Oromia	E.Wollega	Gida Ayana	Yes	Sr.Ekuba	445	27	M	S	BSCNUrse
35	Oromia	W.Shoa	Tulu Bolo	Yes	Dr.Alex	80	37	M	M	DiplomaN
36	Oromia	W.Shoa	Teji	Yes	Dr.Alex	225	32	F	M	DiplomaN
37	Oromia	W.Harerge	Hirna	Yes	Dr.Alex	165	30	F	M	H.O

2-List of Non – HCSP health centers in Oromia Region

S. No	Region	Zone	Name of health center	Involvement in the research	Data collected by	Distance from Zone city	Health Care providers interviewed			
							Age	sex	Marital status	Educational status
1	Oromia	Arsi	Addis Hiwot	No						
2	Oromia		Gobesa	No						
3	Oromia		Sagure	No						
4	Oromia	Bale	Goro	Yes	Dr.Alex	513	26	M	S	HO
5	Oromia		Haroduma	No						
6	Oromia		Jara	Yes	Dr. Alex	560	35	M	M	BSC Nurse
7	Oromia	W/Harrarghie	Boke	No						
8	Oromia		Doba	No						
9	Oromia	E/Hararghe	Bedeno	No						
10	Oromia		Chinakesen	No						
11	Oromia	E/Shoa	Chefe Donsa	Yes	Dr.Solomie	80	23	M	S	HO
12	Oromia	H/G Wollega	Harato	Yes	Ekuba	130	29	M	M	DiplomaN
13	Oromia		Tulu wayu (Dongoro)	Yes	Ekuba	140	26	F	M	Diploma
14	Oromia	E/Wollega	Arjo Gudetu	Yes	Ekuba	60	27	M	M	DiplomaN
15	Oromia		Karimu	Yes	Ekuba	120	30	M	M	DiplomaN
16	Oromia		Uke	Yes	Ekuba	35	26	F	M	DiplomaN
17	Oromia	Guji	Dimtu Hambala	No						
18	Oromia		Qercha	No						
19	Oromia	Borena	Teltele	No						
20	Oromia	Illu Ababora	Chora	Yes	Dr.Tadesse	525	25	M	S	DiplomaN
21	Oromia		supie	Yes	Dr.Tadesse	654	26	M	S	DiplomaN
22	Oromia		Yayu	Yes	Dr.Tadesse	570	27	F	S	DiplomaN

23	Oromia	Jimma	Toba	Yes	Dr.Tadesse	420	25	M	S	DiplomaN
24	Oromia		Saka	Yes	Dr.Tadesse	368	38	M	M	DiplomaN
25	Oromia		Yebu	Yes	Dr.Tadesse	375	29	F	S	HO
26	Oromia	Finfine Special Zone	Mulo Hc	Yes	Dr.Solomie	50	26	M	S	DiplomaN
27	Oromia		Lega Tafo	Yes	Dr.Solomie	30	29	M	M	HO
28	Oromia		Sululta	Yes	Dr.Solomie	30	25	M	S	HO
29	Oromia	N/Show a	Salalkula	No						
30	Oromia		Fitche	Yes	Dr.Solomie	100	28	M	S	DiplomaN
31	Oromia	S/W/ Shoa	Chitu	Yes	Dr.Tadesse	130	28	M	S	HO
32	Oromia	W/ Shoa	Sikaba	No						
33	Oromia		Guder	Yes	Sr.Ekuba	137	28	M	M	DiplomaN
34	Oromia	K/Wollega	Gidami	No						
35	Oromia		Haro Sebu (Alem teferi)	No						
36	Oromia		Lalo	No						
37	Oromia	W/Wollega	Guyi (Genji)	No						
38	Oromia		L/Asabi	No						
39	Oromia		Nole kaba	No						

3-List of HCSP-supported Health centers in Amhara Region:

S. N	Region	Zone	Name of Health center	Involvement research	Data collected by	Distance from zone city	Health Care providers interviewed			
							Age	sex	Marital status	Educational status
1	Amhara	N.shoa	Arerti	Yes	Dr.Sewagegn	175km	24	M	S	DiplomaN
2	Amhara	E. Gojam	Bichena	Yes	Dr.Kinet	95km	24	M	S	DiplomaN
3	Amhara	N. Wollo	Woldia	Yes	Dr.Yared	0km	40	M	M	DiplomaN
4	Amhara	Awi	Chagni	Yes	Dr.Kinet	56km	28	F	M	DiplomaN
5	Amhara	S. Gondar	Nefasmewcha	Yes	Dr.Kinet	100km	24	F	M	DiplomaN
6	Amhara	N. Wollo	Flakit	Yes	Dr.Yared	145km	28	F	M	DiplomaN
7	Amhara	E. Gojam	D.Markos	Yes	Dr.Kinet	0km	30	F	M	BSCNurse
8	Amhara	E. Gojam	Dejen	Yes	Dr.Kinet	70km	43	F	M	DiplomaN
9	Amhara	S.Gondar	Debretabor	Yes	Dr.Kinet	0km	32	M	M	DiplomaN
10	Amhara	Bahir dar	Bahir Dar	Yes	Dr.Kinet	0km	34	F	M	Ho
11	Amhara	S.Gondar	Addis Zemen	Yes	Dr.Solomon	100km	27	F	M	DiplomaN
12	Amhara	S.Gondar	Woreta	Yes	Dr.Kinet	110km	28	F	M	HO
13	Amhara	W.Gojjam	Burie	Yes	Dr.Kinet	151km	24	M	S	DiplomaN
14	Amhara	Awi	Injibara	Yes	Dr.Kinet	0 km	40	F	M	HO
15	Amhara	N.Gondar	Dabat	Yes	Dr.Solomon	75km	22	F	M	DiplomaN
16	Amhara	N.Gondar	Tikildingay	Yes	Dr.Solomon	23km	23	M	S	DiplomaN
17	Amhara	N. Gondar	Koladiba	Yes	Dr.Solomon	30km	27	M	S	HO
18	Amhara	N. Gondar	Delgi	Yes	Dr.Solomon	96km	28	F	M	DiplomaN
19	Amhara	N. Gondar	Azezo	Yes	Dr.Solomon	13km	27	M	M	DiplomaN
20	Amhara	N. Gondar	Aykele	Yes	Dr.Kinet	70km	28	F	M	DiplomaN
21	Amhara	E. Gojjam	Motta	No						

4-Non HCSP Health center in Amhara region

1	Amhara	North Gondar	Abderafi	No because was not accessible for safety reasons

5- List of HCSP-supported Health centers: Tigrai Region

S.No	Region	Zone	Name of health center	Involvement in the research	Distance from zone city	Health care providers interviewed			
						Age	Sex	Marital status	Educational status
1	Tigray	STG	Mekhoni	Yes	145	35	F	M	Dip. Nurse
2	Tigray	SETG	Mekele	Yes	0	48	F	M	Dip. Nurse
3	Tigray	WTG	Maykadra	No					
4	Tigray	SETG	Kasech	Yes	0	41	F	M	Dip. Nurse
5	Tigray	STG	Alamata	Yes	182	34	M	M	Dip. Nurse
6	Tigray	STG	Korem	Yes	165	22	M	S	Dip. Nurse
7	Tigray	SETG	Semien	Yes	0	34	F	M	Dip. Nurse
8	Tigray	SETG	Adishihu	Yes	80	32	F	M	Dip. Nurse
9	Tigray	SETG	Adigudom	Yes	35	38	F	M	Dip. Nurse
10	Tigray	Eastern	Adigrat	Yes	120	30	F	M	Dip. Nurse
11	Tigray	West	Adidaero	Yes	335	23	F	S	Dip. Nurse
12	Tigray	Central	Axum	Yes	250	38	F	M	Dip. Nurse
13	Tigray	Central	Hagereselam	Yes	55	25	M	S	Dip. Nurse
14	Tigray	Central	Enticho	Yes	175	35	M	M	Dip. Nurse
15	Tigray	Eastern	Hawzen	Yes	105	36	F	M	Dip. Nurse
16	Tigray	West	Shire	Yes	300	50	F	M	Dip. Nurse
17	Tigrai		Atsbi	Yes	75	28	F	M	Dip. Nurse

6-List of Non HCSP supported Health centers in Tigrai Region

	Region	Zone	Name of HC	Involvement in the research	Distance from zone city	Age	Sex	Marital status	Educational status
1	Tigrai		Zalambessa	Yes	160km	26	M	S	Diploma N
2	Tigrai		Adihageray	No					
3	Tigrai		Timuga	Yes	200km	24	M	S	Diploma N
4	Tigrai		Abiadi	Yes	90 km	45	M	M	Diploma N
5	Tigrai		Tsegeda						
6	Tigrai		Adinebried						

7- List of HCSP-supported Health centers: SNNP Region

S.No	Region	Zone	Name of H.C	Involvement in OPR	Data collected by	Distance from zone city	Health Care providers interviewed			
							Age	Sex	Marital status	Educational status
1	SNNPR	Sheka	Tepi	Yes	Dr.Tadesse	60	42	M	M	Diploma N
2	SNNPR	Gurage	Wolkite	Yes	Dr.Tadesse	0	40	F	M	Diploma N
3	SNNPR	Sidama	Bushulo	Yes	Dr.Lisanu	3	33	F	M	HO
4	SNNPR	Wolayita	Sodo	Yes	>>	0	26	M	S	Ho
5	SNNPR	Gofa	Sawula	Yes	>>	250	45	F	M	Dilopma N
6	SNNPR	Sidama	Awassa	Yes	>>	0	38	F	M	Dilopma N
7	SNNPR	Gofa	Arbaminch	Yes	>>	0	34	F	M	Dilopma N
8	SNNPR	Wolaita	Bodity	Yes	>>	18	35	M	S	Dilopma N
9	SNNPR	Wolaita	Bedessa	Yes	>>	26	28	F	M	Dilopma N
10	SNNPR	Shekoch	Alaba	Yes	>>	0	26	F	M	Dilopma N
11	SNNPR	Sidama	Wondo Genet	Yes	>>	40	36	M	S	Dilopma N
12	SNNPR	Sidama	Aleta Wondo	Yes	>>	80	26	M	S	Dilopma N

8-List of Non HCSP health centers in SNNP Region

Serial No	Region	Zone	Name of Health center	Involvement in Data collected by		Distance from Zone	Age	Sex	Marital status	Educational status
1	SNNPR	Wolaita	Tomogera	No		17				
2	SNNPR	Kembata-Tembaro	Hadero	Yes	Dr.Lisanu	28	25	M	S	Diploma N
3	SNNPR	Kembata-Tembaro	Tunto	Yes	Dr.Lisanu	31	26	M	S	Diploma N
4	SNNPR	Gamo Goffa	Geresse	X		X				
5	SNNPR	Gamo Goffa	Lante	Yes	Dr.Lisanu	17	35	M	M	HO
6	SNNPR	Gamo Goffa	Wacha	X		80				
7	SNNPR	Gamo Goffa	Shelle	Yes	Dr.Lisanu	30	23	M	S	Diploma N
8	SNNPR	Siltie	Lera	No		80				
9	SNNPR	Siltie	Kilto	Yes	Dr.Lisanu	30	22	F	M	BCSNurse
10	SNNPR	Hadiya	Geja	Yes	Dr.Lisanu	45	26	M	S	HO
11	SNNPR	Hadiya	Homecho	Yes	Dr.Lisanu	45	25	F	S	Diploma N
12	SNNPR	Hadiya	Doisha	X		57				
13	SNNPR	Hadiya	Omochora	Yes	Dr.Lisanu	30				
14	SNNPR	Hadiya	Morsito	Yes	Dr.Lisanu	17	34	M	M	HO
15	SNNPR	Gurage	Kella	Yes	Dr.Sewagene	95	32	M	S	HO
16	SNNPR	Gurage	Butajera	Yes	Dr.Sewagen	110				
17	SNNPR	Gurage	Wesherebe	Yes	Dr.Sewagegn	35	22	F	S	Diploma N
18	SNNPR	Siltie	Shilmat	Yes	Dr.Lisanu	35	25	M	S	HO
19	SNNPR	Gurage	Koshe	I		25				
20	SNNPR	Sidama	Yirba	Yes	Dr.Lisanu	50	29	M	S	Diploma N
21	SNNPR	Sidama	Bona			120				
22	SNNPR	Sidama	Yirgalem	Yes	Dr.Sewagegn	45	33	M	M	HO

23	SNNPR	Sidama	Yaye			50				
24	SNNPR	Sidama	Wajigra			30				
25	SNNPR	Sidama	Chuko	Yes	Dr.Sewagegn	45	24	M	S	HO
26	SNNPR	Bench Maji	Debrework			X				
27	SNNPR	Kaffa	Deka			X				
28	SNNPR	Gedeo	Bule	Yes	Dr./Sewagegn	45	28	M	S	Diploma N

Annex-V: compiled Data Dec2008-2010 HCSP and Non HCSP HCs

1-Compiled HCSP supported health centers data on adult, pediatrics, HEI follow up care Data – end of Dec 2008, 2009, 2010

	Health HCSP –Supported	Number of Adults enrolled			Pediatric Case Burden			Exposed Infants								Level of Care			
		PRE ART	On ART	Total	Ped Pre ART	Ped On ART	Total Ped	Total no. HEI	DBS test done	DBS Negative	DBS Positive	DBS Pos on ART	Rapid test neg 9 mo-18 mo non BF infants	DBS Pos –Ref	DBS Pos-Dead	Level of pt care	Range Percent of ped On ART	Median % of ped On ART	Mean %Of ped On ART
Dec 2008		**15969**	**11355**	**27324**	**672**	**67**	**739**	**75**	**4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**Poor for 23 HCs, Zero for 52 HCs ND for 4 Hc**	**0-4.6 %**	**1.96 %**	**2.18%**
Dec 2009		**27501**	**20835**	**48336**	**1640**	**518**	**2158**	**1390**	**639**	**562**	**74**	**56**	**254**			**Poor (Look at Median /Mean)**	****0.17-9.0 %**	**2.58 %**	**3%**
Dec 2010		**34471**	**29801**	**64272**	**2280**	**1143**	**3423**	**3623**	**2215**	**1932**	**222**	**121**	**788**			**Poor (Look at Median /Mean)**	**0.46-12.2 %**	**3%**	**4.1 %**

****The range is 0.17-20 % (two out lyres removed) and the mean which was 2.9 % was adjusted to 3.0% ,ND – no data available**

2- Compiled Non- HCSP supported health centers data on adult, pediatrics, HEI follow up care Data – end of Dec 2008, 2009, and 2010

	Non - HCSP –Supported Health centers	Number of Adults enrolled			Pediatric Case Burden			Exposed Infants										
		PRE ART	On ART	Total	Ped Pre ART	Ped On ART	Total Ped	Total no. Exposed	DBS test done	DBS Negative	DBS Positive	DBS Pos on ART	Rapid test neg 9 mo-18 mo non BF infants	DBS Pos –Ref	DBS Pos-Dead	Level of pt care	Range Percent of ped On ART	Median % of ped On ART	Mean %Of ped On ART
Dec 2008		90	16	106	2	0	2	ND	ND	ND	ND	ND	ND	ND	ND	Poor for 4 HC No data for the rest	Zero for 4 HC for the rest data not available	0	0
Dec 2009		378	144	522	27	10	37	5	1	1	0	0	0	ND	ND	Look at Median	0-20*%	0%	0.083 %
Dec 2010		1245	1022	2267	104	62	166	110	36	20	1	1	1	ND	ND	Look at Median	0-26.1%**	0	3.4%

***20 is one out lier value and was removed in the calculation of the mean**

*** *26.1 is an out-lier value**

Annex VI: Declaration

Declaration

I the Undersigned declare that this thesis is my Original in Partial fulfillment of the requirement for the degree of master of public Health. I also declare that it has never been Presented in this or any other university and that all resources and materials used in the thesis have been duly acknowledged.

Student Name: _____

Signature: _____

Place of submission: _____

Date of submission: _____

This thesis has been submitted for examination with approval as a university advisor.

Advisor Name: _____

Signature: _____

Date of submission: _____

References:

1- UNAIDS Report on the Global HIV /AIDS Epidemic available from: http://www.unaids.org/globalreport/documents/20101123_GlobalReport_full_en.pdf

2- Anti retro Viral Therapy for HIV infection in infants and children : Towards universal access 2010 WHO Guide line available from : http://www.who.int/hiv/pub/paediatric/infants2010/en/index.html

3- WHO/Epidemiological Fact Sheet on HIV/AIDS, core data on Epidemiology and response, October 2008, available from : http://apps.who.int/globalatlas/predefinedReports/EFS2008/full/EFS2008_ET.pdf

4- The National HIV Fact Sheet by ARC FHAPCO, 2009 available from: http://www.etharc.org/

5- Increasing pediatric care and treatment uptake at ICAP supported sites scaling down pediatric HIV to scale up the care, ICAP Collaborative PMTCT and Pediatrics HIV strategic Planning work shop in Partner-ship with Tygerberg Children's Hospital, south Africa and S2S in April 2008, Available from : *www.columbia-**icap**.org*

6- G.Shongwe, Y.Mahlangu, M.Selala: Increasing access to ARV: implementing a system of down referral of ART stable patients to PHCs in Ekurhuleni district, Gauteng province, XVIII International AIDS Conference, July 18-23, 2010 vienna Austria; 1

7- J.Pfeiffer, P.Montoya,A.J, A.JBaptisa, M.Karagianis, M.de.M.Pugas,W.Johnson *et.al:* Integration of HIV /AIDs services into African PHC: Lessons learned for health system strengthening in Mozambique –a case study: Journal of the international AIDS society, 2010, 13:3: 5-7

8- P. Neluheni Tshiwela, Getting more children in to care in south Africa, XVII international AIDS conference, Aug 3 rd 2008 Mexico city, Mexico.

9- F.Shambusho, JV.Grienseven, D.lowrence, I.Turate, M.A.Weaver,J.Price *etal.* Task shifting for Scale up of HIV care Evaluation of Nurse Centered Anti retroviral treatement at Rural Health centers in Rwanda : PLoS Medicine, October 2009,6:10: 8-9

10- Marion E McNabb, Cynthia S Hiner, Anne Pfitzer, Yassir Abduljewad, Mesrak Nadew, Petros Faltamo,Jean Anderson, Tracing Working status of HIV /AIDS –trained service providers by means of a training information monitoring system in Ethiopia, Human Resources For Health, April 2009, 7 (29) : 1

11- Minutes of the monthly Regular National Pediatric TWG Meeting, FMOH, strategies to increase Pediatric HIV care enrollment, May,25, 2010, 6:2 (Unpublished minutes)

12- Guideline for Coordination and implementation of HIV training in Ethiopia, FMOH, January 2009, 1:43

13- Encyclo- Online encyclopedia, available from:

www.encyclo.co.uk/define/multidisciplinary